Tanta University

Department: Elec. Computers & Control Engineering
Total Marks: 15 Marks

Faculty of Engineering

Course Title: Control Engineering	Course Code: CCE3115	Year: 3rd
Date: 3-12 -2015 (Mid term exam)	Allowed time: 1.5 hrs	No. of Pages: (1)

Problem number (1) **(5 Marks)**

A unity feedback control system has an open loop T.F as follows:

$$GH(S) = \frac{0.5(1+\frac{S}{1})(1+\frac{S}{10})}{S\left(1+\frac{S}{5}\right)\left(1+\frac{S}{50}\right)^2}$$

(i) Sketch the bode diagram for the system
(ii) Determine the gain margin (GM), phase margin (PM), the phase crossover frequency (w_{pc}), the gain crossover frequency (w_{gc}).
(iii) Check the system stability

Problem number (2) **(5 Marks)**

The open loop T.F of a system is given as :

$$GH(S) = \frac{K\,S}{(S^2+4)(S+5)}$$

(i) Sketch the root locus. (ii) Determine the range of K for system stability.

Problem number (3) **(5 Marks)**

A unity feedback control system has an open loop T.F as follows:

$$GH(S) = \frac{1}{(S+0.5\,)(S+2)(S+1)}$$

(i) Sketch the polar plot for the system .
(ii) Determine the gain margin (GM), phase margin (PM), the phase crossover frequency (w_{pc}), the gain crossover frequency (w_{gc}).
(iii) Check the system stability

Good luck

Dr. M. Arafa